

January, 2004

CURRICULUM VITAE

NAME: Lawrence Mark Silverman S.S.#: ---

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EDUCATION:

B.A. Chemistry  
Washington and Jefferson College  
Washington, Pennsylvania

NIH Trainee in Clinical Chemistry

Ph.D., Physiological Chemistry  
Ohio State University  
Columbus, Ohio  
Research Director: ---

Postdoctoral Fellow, Dept. of Pathology  
Ohio State University  
Columbus, Ohio

EMPLOYMENT HISTORY:

2002-	Professor of Pathology Scientific Director of Molecular Diagnostics Department of Pathology University of Virginia Health Sciences Center Charlottesville, Virginia
1995-2002	Professor of Pathology and Laboratory Medicine, Genetics, and Molecular Biology, Research Professor of Biochemistry and Biophysics
1988-2002	Director, Division of Molecular Pathology Department of Pathology Member, Curriculum in Genetics (1993-) University of North Carolina Medical School Chapel Hill, North Carolina

1986-1994	Associate Professor of Pathology and Research Associate Professor of Biochemistry
1979-2002	Associate Director of Clinical Chemistry Director, Special Chemistry Laboratory Department of Hospital Laboratories North Carolina Memorial Hospital Chapel Hill, North Carolina
1979-1986	Assistant Professor of Pathology and Research Assistant Professor of Biochemistry University of North Carolina Chapel Hill, North Carolina
1976-1979	Director of Clinical Chemistry Hospital of the Good Samaritan Los Angeles, California
1977-1979	Assistant Clinical Professor of Pathology University of Southern California Los Angeles, California
1969-1971	Medical Laboratory Specialist, 5th Class, US Army

#### CERTIFICATION/LICENSURE:

American Board of Clinical Chemistry, ---  
American Board of Medical Genetics (Clinical Molecular Genetics), ---

#### PROFESSIONAL SOCIETIES:

1973-	American Association for Clinical Chemistry  <u>North Carolina Section:</u> Secretary-Treasurer, 1984-85; Nominating Committee, 88-90; Chair, 1992-  <u>Southern California Section:</u> Councillor, 1978-79  <u>National Committees:</u> Awards Committee, 1985-1989; Symposium Committee, AACC National Meeting, 1984; Abstracts Committee, AACC National Meeting, 1984; Program Committee, Beckman Symposium, 1989; Symposium Committee, Co-Chair, AACC National Meeting, 1991; Executive Committee, AACC National Meeting, 1991; Public Information Committee, 1991-94
1978-	American Association for Advancement of Science
1979-	Academy of Clinical Laboratory Physicians and Scientists

1990- American Society for Human Genetics

PROFESSIONAL SERVICE:

Member, Foundation for Cardiovascular Research Research Committee, 1978-79  
(Pasadena California)

Clinical Advisory Board, Beckman Instruments, Inc. 1983-1985

Diagnostic Advisory Board, Hybritech, Inc., 1985-1988

Editorial Advisory Board, Clinical Chemistry News, 1987-1989

Board of Editors, Yearbook of Pathology and Clinical Pathology, 1986-91

Board of Editors, Clinical Chemistry, 1990-1999

Board of Editors, Clinica Chimica Acta, 1999-

Editorial Advisory Board, *Strategies for Clinical Chemistry*, 2000-

Executive Committee, Clinical Chemistry, Reviews Editor, 1995-1999

Board of Editors, American Journal of Clinical Pathology, 1993-1998

Beckman Conference Organizing Committee, 1988-1989

Commission on Accreditation in Clinical Chemistry, Board of Directors, Vice-President for Program Evaluation, 1989-

International Federation of Clinical Chemistry Committee on Molecular Techniques, 1995-1998

Neurofibromatosis Integration Panel - US Army Medical Research and Materiel Command, 1996-1999

American Board of Clinical Chemistry, Director, 1996-2002,  
Vice-President (Credentials), 1998-;  
Chair, Molecular Diagnostics Board Exam Committee, 1998-

Clinical Laboratory Improvement Act Committee, Work Group on Genetic Diseases, 1997-

Clinical Laboratory Improvement Act Committee, Full Committee, 1999-2002

Chair, CLIAC Genetics Working Group, 2000

Consultant, Food and Drug Administration, Medical Device Advisory Committee:  
Molecular and Clinical Genetics Panel 1999-

Scientific Advisory Board, PPGx, 2000-

Invited Reviewer - Clinical Chemistry, Archives of Pathology and Laboratory Medicine, Annals of Clinical and Laboratory Science, Journal of Pediatrics, Journal of the American Medical Association, Biotechniques, American Journal of Clinical Pathology, Journal of Medical Genetics, Clinica Chimica Acta

#### GRANTS AND CONTRACTS FUNDED:

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|-----------|--|
| 1978-80   | "Creatine Kinase BB as a Marker of Prostatic Carcinoma", NIH CA-25057, Principal Investigator.   |
| 1978-79   | "Biological Significance of Gp48 in the Diagnosis of Breast and Other Adenocarcinomas", NIH CA-24645, Co-Principal Investigator.         |
| 1981-83   | "Creatine Kinase BB as a Tumor Marker", NIH CA-32585, Co-Principal Investigator.   |
| 1983-86   | "Clinical Significance of Two-Dimensional Electrophoresis", Principal Investigator for Clinical Research, Contract for ---               |
| 1988-89   | "Use of Dried-Blood Filters in Screening for Duchenne Muscular Dystrophy", -----, Principal Investigator.                                |
| 1990-1993 | "Mutation Detection in Variant Cystic Fibrosis Families", --- Co-Principal Investigator (1990-1991), Principal Investigator (1992-1993). |
| 1991-1994 | "An Evaluation of Testing and Counseling for CF Carriers", NIH-Human Genome Project, Co-Principal Investigator.                          |
| 1991-1992 | "Isolation of Fetal Cells from Maternal Circulation", ---, Principal Investigator.   |
| 1993-1995 | "CFTR Mutations in Urogenital Forms of Cystic Fibrosis", ---, Principal Investigator.  |
| 1995-1997 | "Protein Truncation Test in NF1", ---, Principal Investigator.   |
| 1995-1996 | "Mutations in the neurofibromatosis 1 gene detected by screening for truncated proteins", ---, Principal Investigator.                   |
| 1996-1998 | "In vitro analysis of exon 9 splicing in the CF gene". --- Principal Investigator.   |
| 1996-1997 | "The 5T Allele: A Novel Mutational Mechanism & Its Role in Atypical Forms of Cystic Fibrosis", ---, Principal Investigator.              |

1996-1999	"Evaluation of Testing and Counseling for Carriers of Hemophilia A". ---, Co-Investigator.
1998-2000	"Hemochromatosis: A Modifier Gene for Cystic Fibrosis". ---, Principal Investigator
2000-2002	"Efficacy of Gentamicin on the Supression of Different CFTR Nonsense Mutations", ---, ---.
2000-2002	"Liver Disease in CF and Alpha <sub>1</sub> -Antitrypsin Deficiency", ---, Principal Investigator
2001-2006	Gene Modifiers in CF Lung Disease, ---, Co-Principal Investigator
Pending	Genetic Modifiers of CF and $\alpha$ 1-antitrypsin Liver Disease, ---, 5 years, Principal Investigator

#### HOSPITAL AND UNIVERSITY COMMITTEES:

Research Advisory Committee (Department of Hospital Laboratories), Chair 1983-1986, Co-chair 1986-2000

Biological Sciences Research Center Advisory Committee (UNC School of Medicine) 1987-2000

Faculty Council (UNC) 1987-1990

Task Force on Human Genetics 1989

Innovative Projects Evaluation Committee 1990-

Current Topics in Laboratory Medicine, Chair 1992-

University Committee on Gene Therapy, 1992-

Qualifying Examination Committee, Genetics Curriculum, 1995-Chair, 1996

#### OTHER ADMINISTRATIVE ACTIVITIES:

Director of Immunochemistry/Special Chemistry  
Director, Molecular Genetics/Molecular Pathology

#### TEACHING RESPONSIBILITY:

Medt 951-052 - Clinical Biochemistry for medical technologists

General Pathology	- Pathology course for 2nd year medical students
Medical Genetics	- Genetics course for 2nd year medical students
GNET174	- Human Genetics for graduate students
Contact hours	- Postdoctoral fellows - 6 hrs/wk Pathology residents - 10 hrs/core rotation Medical students - 3 hrs/wk, during Medical Genetics course

PUBLICATIONS:  
IN REFEREED JOURNALS:

1. *Silverman, L.M.*: Creatine phosphokinase isoenzymes and muscular dystrophy. Ohio Journal of Medical Technology 2, 1974.
2. *Silverman, L.M.*, Mendell, J.R., Sahenk, Z., and Fontana, M.B.: The significance of creatine kinase isoenzymes in muscular dystrophy. Neurology 26, 561-564, 1976.
3. Mendell, J.R., *Silverman, L.M.*, et al.: Imipramine-serotonin induced myopathy. Neurology 26, 968-974, 1976.
4. *Silverman, L.M.* and Gruemer, H.D.: Sarcolemmal Membrane Changes Related to Enzyme Release in the Imipramine-serotonin Animal Model. Clin. Chem. 22, 1710-1714, 1976.
5. Mendell, J.R., Sahenk, Z., and *Silverman, L.M.*: Relationship of Biogenic Amines to Muscular Dystrophy. Excerpta Medica, 1977.
6. *Silverman, L.M.*, Dermer, G.B., and Tokes, Z.A.: Serum Glycoprotein Electrophoretic Patterns Reflect the Presence of Human Breast Cancer. Clin. Chem. 23, 2055-2058 (1977).
7. *Silverman, L.M.*, Perera, S., Caruso, L.M., and Pincus, F.E.: Creatine kinase BB isozyme activity in bone marrow serum. Clin. Chem. 24, 1423-1425 (1978).
8. Apt, L., Hendrick, A., and *Silverman, L.M.*: Patient compliance with use of topical ophthalmic corticosteroid suspensions. American Journal of Ophthalmology 87, 210-214 (1979).
9. Dermer, G.B., *Silverman, L.M.*, Tisman, G., and Tokes, Z.A.: Electrophoretic patterns for serum glycoproteins reflect the presence of human breast cancer: Part 2 - High resolution studies of various adenocarcinoma types. Clin. Chem. 26, 392-396 (1980).

10. *Silverman, L.M.*, and Dermer, G.B.: Alterations of serum glycoprotein-Possible biologic markers of tumor-host responsiveness. *Clin. Chem.* 25, 807-808 (1979).
11. Zweig, M.H., *Silverman, L.M.*, Dermer, G.B., and Van Steirteghem, A.C.: Creatine kinase BB isoenzyme as an indicator of active metastatic disease, *Clin. Chem.* 25, 1190-1191 (1979).
12. *Silverman, L.M.*, Dermer, G.B., Zweig, M.H., and Van Steirteghem, A.C.: Creatine kinase BB - A new tumor marker. *Clin. Chem.* 25, 1432-1435 (1979).
13. Gendler, S.J., Dermer, G.B., *Silverman, L.M.* and Tokes, Z.A.: Synthesis of alpha<sub>1</sub> antichymotrypsin and alpha<sub>1</sub> acid glycoprotein by human breast epithelial cells. *Cancer Res.* 42, 4567-4573 (1982).
14. Siegel, A.J., *Silverman, L.M.*, and Lopez, R.E.: Creatine Kinase Elevations in Marathon Runners: Relationship to Training and Competition. *Yale Journal in Biology*, 53, 275-279 (1980).
15. Siegel, A.J., *Silverman, L.M.* and Holman, B.L.: Elevated Creatine Kinase MB Isoenzyme Levels in Marathon Runners. *JAMA*, 246, (2049-2051) 1981.
16. *Silverman, L.M.*: Creatine Kinase BB and Other Markers of Prostatic Carcinoma, the Prostate, 2, 1-13 (1981).
17. Hall, M., Chapman, J.F., Johnson, M.A., *Silverman, L.M.*: CK-BB in Amniotic Fluid. *Clin. Chem.* 28, 558-559 (1982).
18. Dermer, G.B., *Silverman, L.M.*, and Chapman, J.F.: Enhancement Techniques for Detecting Trace and Fluid Specific Proteins. *Clin. Chem.* 28, 759-765 (1982).
19. Siegel, A.J., *Silverman, L.M.*, and Evans, W.J.: Elevated Skeletal Muscle Creatine Kinase MB soenzyme Levels in Marathon Runners. *JAMA*, 250, 2835-2837 (1983).
20. Winfield, J.B., Shaw, M., *Silverman, L.M.*, and Koffler, D.: Evidence for Intrathecal IgG Synthesis and Blood - Brain Barrier Impairment in Patients with Systemic Lupus Erythematosus and Central Nervous System Dysfunction. *Am. J. Med.* 74, 837-851 (1983).
21. Symanski, J.D., McMurray, R.G., *Silverman, L.M.*, Smith, B.W., and Siegel, A.J.: Serum creative kinase and CK MB isoenzyme responses to acute and prolonged swimming in trained athletes. *Clin. Chim. Acta.* 129, 181-187 (1983).
22. Christenson, R.H., Behlmer, P., Howard, J.F., Winfield, J.B., and *Silverman, L.M.*: Interpretation of Cerebrospinal Fluid Protein Assays in Various Neurologic Diseases. *Clin. Chem.* 29, 1028-1030 (1983).

23. Siegel, A.J., *Silverman, L.M.*, Holman, B.L.: Myocardial and Skeletal Muscle Studies in Marathon Runners. *American Journal of Medicine*, 79, 431 (1985)
24. Wanger, A., Hall, M., Mickey, D., and *Silverman, L.*: In Vitro characterization of MAT Ly Lu: A Dunning rat prostate adenocarcinoma tumor subline. *J. Urol.*, 131:1232-1236, (1984)
25. Siegel, A.J., Warhol, M., Evans, W.J., *Silverman, L.M.*: Ultrastructural Changes in Skeletal Muscle of Marathon Runners, 118, 331-339 *Am. J. Path.* (1985)
26. Hall, M., *Silverman, L.*, Wenger, A., Mickey, D.: Oncodevelopmental Enzymes of the Dunning Rat Prostatic Carcinoma, *Cancer Research*, 45:4053 (1985)
27. Hall, M., Mickey, D., Wenger, A., and *Silverman, L.*: Adenylate kinase: An oncodevelopmental marker in an animal model for human prostate cancer. *Clinical Chemistry*, 31, 1689 (1985)
28. Lubahn, D.B. and *Silverman, L.M.*: A Rapid Silver Stain Procedure for use with Routine Electrophoresis of Cerebrospinal Fluid on Agarose Gels. *Clin. Chem.* 30, 1989-1691 (1984).
29. Christenson, R.H., Russell, M.E., Gubar, K. *Silverman, L.M.* and Ebers, G.C.: Assessment of Oligoclonal Binding in Cerebrospinal Fluid Using Agarose Electrophoresis Following Centrifugal Preconcentrations through a Microconcentrator Membrane. *Clin. Chem.* 31, 1734 (1985).
30. Wenger, A.S., Hall, M., Mickey, G.H., *Silverman, L.M.*, Fried, F.A. and Mickey, D.D.: Dimethylsulfoxide - Induced Changes in a Rat Prostate Adenocarcinoma. *Prostate* 6, 329-342, (1985)
31. Fernandez, C., Rifai, N., Wenger, A.S., Mickey, D.D. and *Silverman, L.M.*: A preliminary study of urinary transferrin as a marker for prostatic cancer. *Clin. Chimica. Acta.* 161, 335-339, 1986.
32. Siegel, A.J., *Silverman, L.M.*, and Tennyson, G.: CKMB in Skeletal Muscle. *N. Eng. J. Med.* 314, 990, 1986.
33. Rifai, N. and *Silverman, L.M.*: Immunoturbidimetric techniques for quantifying apolipoprotein CII and CIII. *Clin. Chem.* 32, 1969-1972 (1986).
34. Cresson, D.H., and *Silverman, L.M.*: The Biology of Tumor Markers. *Emergency Medicine*, 18, (1986).
35. LeGrys, V., Leinbach, S., and *Silverman, L.*: Uses of Recombinant DNA Techniques for Genetic Analysis. *CRC Critical Reviews in Clinical Laboratory Sciences* 25(4), 255-274 (1987).



36. Rifai, N., Christenson, R.H., Gelman, B., and *Silverman, L.M.*: Automated determination of apolipoprotein A1 and apolipoprotein E in cerebrospinal fluid. *Clin. Chem.* 32, 207 (1986).
37. Gilchrist, J.M., Pericak-Vance, M., *Silverman, L.M.*, and Roses, A.D.: Clinical and genetic investigation in autosomal dominant limb-girdle muscular dystrophy. *Neurology* 38(1), 5-9 (1988).
38. Rifai, N. Gubar, K. and *Silverman, L.M.*: Immunoturbidimetry: An attractive technique for the determination of urinary albumin and transferrin. *Clin. Biochem.* 20, 179-181 (1987).
39. Rifai, N. and *Silverman, L.M.*: A simple immunotechnique for the determination of serum concentration of apolipoprotein E. *Clin. Chim. Acta.* 163, 207-213 (1987).
40. Gelman, B., Rifai, N., Christenson, R., and *Silverman, L.*: Cerebrospinal fluid apolipoprotein E index in patients with multiple sclerosis. *Ann. Clin. Lab. Sci.* 18, 46-52, 1988.
41. Rifai, N. McMurray, R. and *Silverman, L.M.*: The effects of different behavioral patterns on the lipoprotein profile. *Clinica Chimica Acta*, 169 (2-3), 333-335 (1987).
42. Rifai, N., Christenson, R.H., Gelman, B.B., and *Silverman, L.M.*: Changes of cerebrospinal fluid IgG and apolipoprotein E indices in patients with multiple sclerosis during demyelination and remyelination. *Clin. Chem.* 33, 1155-1158 (1987).
43. LeGrys, V.A. and *Silverman, L.M.*: Applications of linkage analysis in cystic fibrosis testing. *Emergency Medicine*, 19, 57-89 (1987).
44. Ledue, T.B., Rifai, N., Irish, G.R., and *Silverman, L.M.*: Immunoturbidimetric quantification of prealbumin in human serum. *Clin. Chem.* 33, 1260 (1987).
45. Lubahn, D.B., Bosco, J., Krishtein, J., Jeffries, O.J., Parker, N., Levtzow, C., *Silverman, L.M.*, and Graham, J.B.: Population genetics of coagulant Factor IX: Frequencies of two DNA polymorphisms in five ethnic groups. *Am. J. Hum. Genet.* 40, 527-536 (1987).
46. Rifai, N., Chapman, J.F., *Silverman, L.M.*, Gwynne, J.T.: Review of serum lipids and apolipoproteins in risk-assessment of coronary heart disease risk. *Ann. Clin. Lab. Sci.* 18, 429-439 (1988).

47. Bankson, D.D., Rifai, N., and *Silverman, L.M.*: Immunoturbidimetric measurement of serum retinol-binding protein in renal and hepatic disease. *Annals of Clinical Biochemistry*, 25(3), 246-249 (1988)
48. Bankson, DD, Rifai, N., and *Silverman, L.M.*: Serum retinol-binding and creatinine in onset of and recovery from acute renal failure. *Clin. Chem.* 33, 1942 (1987)
49. *Silverman, L.M.* and LeGrys, V.A.: The acute phase response and clinically significant proteins. *J. Med. Technol.* 4, 154-164 (1987).
50. Christenson, R.H., Finley, P.R., and *Silverman, L.M.*: Immunochemical assays of IgG, IgA, IgM and transferrin compared. *Clin. Biochem.* 22, 271-276 (1989).
51. Bankson, D.D., Rifai, N., Williams, M.E., *Silverman, L.M.*, and Gray, T.K.: Biochemical effects of 17-OH estradiol on UMR cells. *Bone and Mineral* 6, 55-63 (1989).
52. *Silverman, L.M.* and LeGrys, V.A.: DNA analysis in the detection of genetic diseases. *New Developments in Medicine* 4(1), 69-78 (1989).
53. *Silverman, L.M.* Parker, S. Rifai, N., and Bankson, D.D.: Impact of CK isoenzyme methods in the management of acute myocardial infarction. *Clin. Chem. News.* 14 (#12), 6-7 (1988).
54. Highsmith, W.E. and *Silverman, L.M.*: Use of the polymerase chain reaction for the simultaneous analysis of two Pst I polymorphisms linked to cystic fibrosis. *Clin. Chem* 35(6), 1260-1261 (1989).
55. Prior, T. Friedman, K., and *Silverman, L.M.*: RFLP for HindIII at the Duchenne muscular dystrophy gene. *Nucleic Acids Research* 17(6), 2370 (1989).
56. Prior, T.W., Friedman, K.J., and *Silverman, L.M.*: Detection of Duchenne/Becker muscular dystrophy carriers by densitometric scanning. *Clin. Chem.* 35(6), 1256-1257(1989).
57. Christenson, R.H., Ohman, E.M., Clemmensen, P.G. Toffaletti, J., *Silverman, L.M.*, Vollmer, R.T., and Wagner, G.S.: Characteristics of creatine kinase-MB and MB isoforms in serum after reperfusion in acute myocardial infarction. *Clin.Chem.* 35(11), 2179-2186 (1989).
58. Prior, T.W., Friedman, K.J., Highsmith, W.E., Perry, T.R., and *Silverman, L.M.*: Molecular probe protocol for determining carrier status in Duchenne and Becker muscular dystrophies. *Clin. Chem.* 36(3), 441-445 (1990).
59. Friedman, K.J., Highsmith, W.E., Prior, T.W., Perry, T.R., and *Silverman, L.M.*: Cystic fibrosis deletion mutation detected by PCR-mediated site-directed mutagenesis. *Clin. Chem.* 36 (#4), 695-696 (1990).

60. Highsmith, W.E., Chong, G.L., Orr, H.T., Perry T.R., Schaid, D., Farber, R., Wagner, K., Knowles, M.R., Warwick, W.J., *Silverman, L.M.*, and Thibodeau, S.N.: Frequency of the delta Phe 508 mutation and correlation with XV.2c/KM-19 haplotypes in an American population of cystic fibrosis patients: Results of a collaborative study. *Clin. Chem.* 36 (#10), 1741-1746 (1990).
61. Prior, T.W., Highsmith, W.E., Friedman, K.F., Perry, T.R., and *Silverman, L.M.*: A model for molecular screening of newborns: Simultaneous detection of Duchenne/Becker muscular dystrophies and cystic fibrosis. *Clin. Chem.* 36 (#10), 1765-1768 (1990).
62. Prior, T.W., Papp, A.C., Snyder, P.J., Highsmith, W.E., Friedman, K.J., Perry, T.R., *Silverman, L.M.*, and Mendell, J.R.: Determination of carrier status in Duchenne and Becker muscular dystrophies by quantitative polymerase chain reaction and allele-specific oligonucleotides. *Clin. Chem.* 36 (#12), 2113-2117, 1990.
63. Cystic Fibrosis Genetic Analysis Consortium. Worldwide survey of the delta F508 mutation. *American Journal of Human Genetics* 47, 354-359 (1990).
64. Christenson, R.H., Ohman, E.M., Clemmensen, P.G., Toffaletti, J., *Silverman, L.M.*, Vollmer, R.T., and Wagner, G.S.: Relative increase in creatine kinase MB isoenzyme during reperfusion after myocardial infarction is method dependent. *Clin. Chem.* 36 (#8), 1444-1449 (1990).
65. Hall, C.D., Snyder, C.R., Messenheimer, J.A., Robertson, W.T., Whaley, R.A., van der Horst, C., Robertson, K.R., and *Silverman, L.M.*: Cerebrospinal Fluid in Human Immunodeficiency Virus Infection. *Ann.Clin.Lab.Sci.* 22, 139-143 (1992).
66. Friedman, K.J., Highsmith, W.E., and *Silverman, L.M.*: Detection of multiple cystic fibrosis mutations using PCR-mediated site-directed mutagenesis. *Clin. Chem.* 37, 753-755 (1991).
67. Quigley, C.A., Friedman, K.F., Johnson, A., Lafreniere, R.G., *Silverman, L.M.*, et al.: Complete deletion of the androgen receptor gene: Definition of the Null phenotype of the androgen insensitivity syndrome and determination of carrier status. *J. Clin. Endo. Metabol.* 74 (#4), 927-933 (1992).
68. G.J. Tsongalis and *L.M. Silverman*: Molecular pathology of the Fragile X Syndrome. *Arch. Path. Lab. Med.* 117(311), 1121-1126 (1993).
69. G.J. Tsongalis, A McPhail, D. Lodge-Rigal, J.F. Chapman, and *L.M. Silverman*: Localized in situ amplification (LISA): a novel approach to insitu PCR. *Clin Chem.* 40 (#3), 381-384, 1994.
70. W.E. Highsmith, L. Burch, TE Boat, A Spock, J.Gorvoy, L.Quiittel, K.J. Friedman, *L.M. Silverman*, R.C. Boucher, and M.R. Knowles: A novel cystic fibrosis mutation is common in patients with normal sweat chloride concentrations. *NEJM*, 331 (#15), 974-980, 1994.

71. G.J. Tsongalis, W.K. Kaufmann, S.J. Wilson, K.J. Friedman, and *L.M. Silverman*: Rapid screening of p53 mutations using a sensitive heteroduplex detection technique. *Clin Chem* 40 (#3), 485-486, 1994.
72. G.J. Tsongalis and *L.M. Silverman*,: *In Situ* Amplification: Detection of target sequences in whole tissues. *Ann Clin Lab Sci* 24 (#3), 436-440, 1994.
73. Heim, R.A., *Silverman, L.M.*, Farber, R.A., Kam-Morgan, L.N.W., and Luce, M.C.: Screening for truncated NF1 proteins. *Nature Genet.* 8 (#3), 218-219, 1994.
74. Heim, R.A., Kam-Morgan, L.N.W., Farber, R.A., Aylsworth, A., *Silverman, L.M.*, and Luce, M.C.: Distribution of 13 Protein-Truncating Mutations in the neurofibromatosis 1 gene. *Human Molecular Genetics* 4 (#6), 975-981, 1995.
75. Friedman, K.J., Heim, R.A., and *Silverman, L.M.*: Relatively high incidence of CFTR mutations, G85E and 1154InsTC. *Human Mutation* 6, 95-96, 1995.
76. Friedman, K.J., Teichtahl, H., DeKretser, D.M., Temple-Smith, P., Southwick, G.J., *Silverman, L.M.*, Highsmith, W.E., Boucher, R.C., and Knowles, M.R.: Screening Young Syndrome patients for CFTR Mutations. *Am J Respir Crit Care Med* 152, 1353-1357, 1995.
77. Friedman, K.J., Heim, R.A., Knowles, M.R., and *Silverman, L.M.*: Rapid characterization of the variable length polythymidine tract in cystic fibrosis (CFTR) gene: Association of the 5T allele with selected CFTR mutations and its incidence in atypical sinopulmonary disease. *Human Mutation* 10 (#2), 108-115, 1997.
78. Rohlf, EM, Learning, WG, Friedman, KJ, Couch, FJ, Weber, BL, and *Silverman, LM.*: Direct Detection of Mutations in the Breast and Ovarian Cancer Susceptibility Gene BRCA1 by PCR-mediated Site-directed Mutagenesis. *Clin. Chem.* 43(#1), 24-29, 1997
79. Sorenson, JR, Cheuvront, B, DeVellis, B, Callanan, N, *Silverman, LM*, Koch, G, Sharp, T, and Fernald, G.: Acceptance of Home and Genetic Clinic Cystic Fibrosis Carrier Education and Testing by First, Second, and Third Degree Relatives of CF Patients. *AmJMedGen* 70(2), 121-129, 1997.
80. Highsmith, WE, Zhou, Z, Friedman, KE, *Silverman, LM*, Boucher, R, Silverman, LM, Collins, FS, and Knowles, MR: Identification of a splice site mutation (2789+5G>A) associated with small amounts of normal CFTR mRNA and mild cystic fibrosis. *Human Mutation* 9(4), 332-338, 1997.
81. *Silverman, L.M.* and Highsmith, W.E.: Automation and the Single Gene Disorder: Cystic Fibrosis as a Model, *Clin Chem* 1, 7-8, 1992, (Editorial).
82. Cohn, JA, Friedman, KJ, Noone, PG, Knowles, MR, *Silverman, LM*, and Jowell, PS: Mutations in the CFTR gene predispose to Idiopathic Chronic Pancreatitis. *NEJM* 339, 653-658, 1998.
83. Rohlf, EM, Shaheen, NJ, *Silverman, LM*: Is the Hemochromatosis Gene (HFE) a Modifier Locus for Cystic Fibrosis? *Genetic Testing.* 2, 73-76, 1998 .

84. Friedman, KF, Kole, J, Cohn, JA, Knowles, MR, Silverman, LM, and Kole, R. Correction of aberrant splicing of the cystic fibrosis transmembrane conductance regulator (CFTR) gene by antisense oligonucleotides. *JBC*, 274 (#51), 36193-99, 1999.
85. Friedman, KJ, and Silverman, LM, Cystic Fibrosis Syndrome: A New Paradigm for Inherited Disorders and Implications for Molecular Diagnostics, *Clin Chem* 45(#7), 929-931, 1999 (Editorial).
86. Lubin, IM, Yamada, NA, Stansel, RM, Pace, RG, Rohlf, EM, Silverman, LM HFE genotyping using multiplex allele-specific PCR and capillary electrophoresis. *Arch of Path and Lab Med.* 123, 1177-1181, 1999.
87. Rohlf, EM, Puget, N, Graham, ML, Weber, BL, Garber, JE, Skrzynia, C, Halperin, JL., Lenoir, GM, Silverman, LM, and Mazoyer, S. An Alu-mediated 7.1 deletion in *BRCA1* in breast and ovarian cancer families with evidence for a founder effect. *Genes, Chromosomes and Cancer*, 28(#3), 300-307, 2000.
88. Noone, PG, Pue, CA, Zhou, Z, Friedman, KJ, Wakeling, EL, Ganeshanathan, M, Simon, RH, Silverman, LM, Knowles, MR. Lung Disease Associated with the IVS8 5T Allele of the CFTR Gene. *Am J Respir Crit Care Med*, 162(5), 1919-1924, 2000.
89. Rohlf, EM, Chung CH, Yang Q, Skrzynia C, Grody WW, Graham ML, Silverman LM: In-frame deletions of *BRCA1* may define critical functional domains. *Hum Genet* 107(4), 385-390, 2000.
90. Noone, PG, Zhou, Z, Silverman, LM, Knowles, MR, Jowell, P, and Cohn, J. Cystic Fibrosis Gene Mutations and Pancreatitis Risk: Relation to Epithelial Ion Transport and Trypsin Inhibitor Gene Mutations *Gastroenterology*, 121, 1310-1319, 2001.
91. Friedman, KL, Ling, SC, Macek, M, Jr, Handler, AJ, Mack, DR, Colombo, JL, Vavrova, V, Castalso, G, Spina, M, Salvatore, F, Phillips, MJ, Zielenski, J, Tsui, L-C, Durie, PR, Silverman, LM, and Knowles, MR. Complex Multigenic Inheritance Influences the Development of Severe Cystic Fibrosis Liver Disease. Submitted for publication
92. Rohlf, EM, Zhou, A, Sugarman, EA, Heim, RA, Pace, RG, Knowles, MR, Silverman, LM, and Allitto, BA. The I148T CFTR Mutations Confers a Variable Phenotype and Occurs on Multiple Haplotypes. *Genetics in Medicine.* 4(5), 2002, 319-323.
93. Hurford MT, Marshall-Taylor C, Vicki SL, Zhou JZ, Silverman LM, Rezuken WN, Altman A, Tsongalis GJ. A novel mutation in exon 5 of the *ALAS2* gene results in X-linked sideroblastic anemia. *Clin Chim Acta.* 2002 Jul; 321(1-2):49-53.
94. Shaheen, NJ, Silverman, LM, Keku, T, Lawrence LB, Rohlf, EM, Martin, CF, Galenko, J, and Sandler, RS. Association between hemochromatosis (HFE) gene

- mutation carrier status and the risk of colon cancer. J National Cancer Institute, 95 (#2), 154-159, 2003.
95. Highsmith, WE, Friedman, KF, Silverman, LM, and Knowles, MR. A mutation (D1152H) in CFTR with mild lung disease and normal sweat chloride. Am J Respir Crit Care Med. (In press)

#### REVIEW ARTICLES, NON-REFEREED JOURNALS, AND BOOK CHAPTERS.

1. Jacobs, E.J. and *Silverman, L.M.*: The Role of High Density Lipoprotein as a Coronary Risk Factor Bulletin of Laboratory Medicine, North Carolina Memorial Hospital, 49, 1-6 (1980).
2. *Silverman, L.M.*: Developments in the Laboratory Diagnosis of Prostate Cancer. Monograph. SmithKline-Beckman (1981).
3. Chapman, J.F. and *Silverman, L.M.*: Creatine Kinase in the Diagnosis of Myocardial Disease, Bulletin of Laboratory Medicine, North Carolina Memorial Hospital, 60, 1-7 (1982).
4. Boyer, C., *Silverman, L.M.*, Folds, J., Gabriel, D.: Laboratory Diagnosis of Monoclonal Gammopathies. Bulletin of Laboratory Medicine, North Carolina Memorial Hospital, 66, 1-8 (1982).
5. Cresson, D.H., and *Silverman, L.M.*: The Biology of Tumor Markers. Bulletin of Laboratory Medicine, North Carolina Memorial Hospital, 91, 1-9 (1985).
6. Hall, M., *Silverman, L.* Wenger, A., and Mickey, D.: Oncodevelopmental enzymes of the Dunning rat prostatic adenocarcinoma. Year Book of Cancer (1986).
7. *Silverman, L.M.*: Recent Advances in Molecular Genetics (editorial). 1987 Year Book of Pathology and Clinical Pathology, 60-61 (1987).
8. Rifai, N., Chapman, J.F., Gwynn, J., and *Silverman, L.M.*: Interpretation of lipid and apolipoprotein values for the assessment of coronary heart disease risk. Bulletin of Laboratory Medicine, 95, 1-7 (1987).
9. *Silverman, L.M.*: Laboratory Consultant. Clinical Chemistry News, 14/4, 6 (1988).
10. *Silverman, L.M.*: High resolution electrophoresis and immunofixation. Archives of Pathology and Laboratory Medicine. Book Review.
11. Highsmith, W.E. and *Silverman, L.M.*: Clinical applications of the polymerase chain reaction. Bulletin of Laboratory Medicine 104, 1-5 (1989).
12. *Silverman, L.M.*, Dermer, G.B. and Tokes, Z.A.: (1979) Serum glycoprotein electrophoresis in adenocarcinomas. In Developments in Cancer Research, 1: 93-96.

13. Dermer, G.B., *Silverman, L.M.*, and Chapman, J.F.: Clinical Utility of Two-Dimensional Electrophoresis, S.E. Ritzmann. Ed. In Protein Abnormalities, Vol. I, Alan R. Liss, New York, 65-87 (1982).
14. Drummond, R., and *Silverman, L.M.*: Glycoproteins as Tumor-Markers. In Laboratory Diagnosis of Malignancy, B. Statland and P. Winkel (Eds), W.B. Saunders Company, Philadelphia, PA 469-479 (1982).
15. *Silverman, L.M.*, Daasch, V.N., and Chapman, J.F.: Isoenzymes In Clinical Chemistry (Ed. Kaplan and Pesce), C.W. Mosby, St. Louis, pp 953-961 (1984).
16. Chapman, J.F., and *Silverman, L.M.*, and Woodard, L.L.: Acid Phosphatase Isoenzymes, pp 1084-1087 Ibid.
17. Ibid. Alkaline Phosphatase Isoenzymes, pp 1098-1101.
18. Ibid. Creatine Kinase Isoenzymes, pp 1116-1120.
19. Ibid. Lactate Dehydrogenase Isoenzymes, pp 1127-1130
20. *Silverman, L.M.*: Gastrointestinal Fluids, Sweat, and Blister Fluids. In Protein Abnormalities, Volume 3., S.E. Ritzmann and L.M. Killingsworth, Ed., Alan R. Liss, New York (1983).
21. *Silverman, L.M.*, Christenson, R.H., and Grant, G.H.: Amino Acids and Proteins. In Textbook of Clinical Chemistry, Norbert Tietz, Ed., W.B.Saunders, pp 519-619, 1986.
22. Chapman, J.F., Woodard, L.L., and *Silverman, L.M.*: Lactate Dehydrogenase Isoenzymes. In Methods in Clinical Chemistry. Kaplan, L.A., and Pesce, A.J. (Eds), CV Mosby (St Louis), pp 1628-1639 (1987); updated 2nd edition (1989)
23. Ibid. Prostatic Acid Phosphatase. 1415-1430 (updated, 1989)
24. Ibid. Alkaline Phosphatase Isoenzymes. 1808-1829 (updated, 1989)
25. Ibid. Creatine Kinase Isoenzymes. 1595-1611 (updated, 1989)
26. Gubar, K., Christenson, R.H., and *Silverman, L.M.*: Proteins. In Clinical Chemistry. Taylor, H.,(Ed), John Wiley and Sons, 83-108 (1989).
27. Christenson, R.H., and *Silverman, L.M.*: Enzyme Analysis. Ibid, 109-144.
28. Grant, G.H., *Silverman, L.M.*, and Christenson, R.H.: Amino Acids and Proteins. In Fundamentals of Clinical Chemistry. Norbert Tietz, Ed., W.B.Saunders, 291-345 (1987).
29. *Silverman, L.M.*, Daasch, V.N., and Chapman, J.C.: Isoenzymes. In Clinical Chemistry: Theory Correlation and Analysis, 2nd Ed., Kaplan and Pesce (Eds), C.V. Mosby (St. Louis), 787-794 (1989).
30. Chapman, J.F. and *Silverman, L.M.*: Cardiac disease and hypertension, Ibid, 415-426.

31. *Silverman, L.M.* LeGrys, V.A. and Parker, N.C.: Use of Nucleic Acid Probes in the Clinical Laboratory. *Ibid.* pp 712-718 (1989).
32. Biesemier, K.W., Holden, K. D., and *Silverman, L.M.*: Alcohol-related non-traumatic rhabdomyolysis. *Clinical Chemistry News*, 18 (#5), 13-14 (1992).
33. *Silverman, L.M.* and Christenson, R.H.: Amino Acids and Proteins. In: Textbook of Clinical Chemistry, 3rd Edition, Burtis and Ashwood, Ed., W.B. Saunders (p625-735) 1993.
34. *Silverman, L.M.* and Highsmith, W.E.: Automation and the Single Gene Disorder: Cystic Fibrosis as a Model, *Clin Chem* 1, 7-8, 1992, (Editorial).
35. W.E. Highsmith and *L.M. Silverman*.: Use of nucleic acid probes in the clinical laboratory. In: Clinical Chemistry: Theory, Analysis and Correlation. 3rd Edition. L. Kaplan and A. Pesce, eds., C.V. Mosby Co. , 1993
36. R. Heim and *L. M. Silverman*, Eds. Molecular Pathology: Approaches to Diagnosing Human Disease in the Clinical Laboratory. Carolina Academic Press. 1994.
37. G. Tsongalis and *L.M. Silverman*, Molecular Diagnostic Tests, In: Guide to Clinical Laboratory Tests, N. Tietz, Ed., W. Saunders (Philadelphia) 1994.
38. A.M. Johnson, EM Rohlf, and *L.M. Silverman*: Proteins. In: Fundamentals in Clinical Chemistry, 4th Edition. (Burtis and Ashwood, Ed.) W. B. Saunders. , 1998.
39. G. Tsongalis and *L.M. Silverman*: DNA Repair: Understanding mechanisms involved in neoplastic diseases. *Clin. Chem. News*, 20 (#10), 8-22, 1994.
40. Rohlf, EM and *Silverman, LM*: Molecular Diagnosis of Inherited Disease . *Medical Laboratory Observer*, 28(#9), 44- 52, 1996.
41. *Silverman, LM*. Prospects for the future role of the clinical laboratory. In: Molecular Diagnostics for the Clinical Laboratorian. (Coleman and Tsongalis, Ed.) Humana Press, 373-378, 1997.
42. Knowles, MR, Friedman, KJ, and Silverman, LM. Genetics, Diagnosis, and Clinical Phenotype. In: Cystic Fibrosis in Adults (Yankaskas and Knowles, Ed.) Lippincott-Raven, 27-44, 1999.
43. Friedman, KJ and Silverman LM, In: Molecular Diagnostics and Genetics, Bruns, Wittwer, Lo, Ed., AACC Press, 236-240, 2002.

INVITED SPEAKER (EXTRADEPARTMENTAL):

1. American Association of Clinical Chemistry Local Section Meeting, St. Louis, MO, "Creatine kinase - Methodologies and Clinical Aspects" May 1, 1981



2. Department of Chemistry, UNC-CH, Guest Speaker "Analytical Chemistry Seminar - Electrophoresis", September 28, 1981
3. Division of Neurology Rounds, "Interpretation of CK Isoenzymes in Muscle Diseases", UNC-NCMH, February 15, 1982
4. Division of Neurology Rounds, "Oligoclonal Bands in MS", UNC-NCMH, December 14, 1982
5. Symposium on Proteins - Beckman Instruments, Inc., Columbia, MD, "Interpretation of Proteins in Serum and CSF", March 10, 1983
6. Prostate Cancer Collaborative Group Seminar, UNC-CH, "Serum Markers of Prostate Cancer", April 7, 1983
7. Symposium on Proteins - Beckman Instruments, Inc., Philadelphia, PA, "Interpretation of Proteins in Serum and CSF", April 14, 1983
8. Prostate Cancer Collaborative Group Seminar, UNC-CH, "Transferrin", May 5, 1983
9. American Association of Clinical Chemistry Section on Animal Chemistry, Southeastern Section Meeting, Burroughs Wellcome, RTP, "Changes of Isoenzymes in Cancer-Bearing Animals", June 3, 1983
10. Symposium on Proteins - Beckman Instruments, Inc., Charlotte, NC, "Interpretation of Proteins in Serum and CSF", September 13, 1983
11. Symposium on Proteins - Beckman Instruments, Inc., Raleigh, NC, "Interpretation of Proteins in Serum and CSF", September 13, 1983
12. Symposium on Proteins - Beckman Instruments, Inc., St. Paul, MN, "Interpretation of Proteins in Serum and CSF", September 16, 1983
13. Symposium on Proteins - Beckman Instruments, Inc., Birmingham, AL, "Interpretation of Proteins in Serum and CSF", October 18, 1983
14. Symposium on Proteins - Beckman Instruments, Inc., Atlanta, GA, "Interpretation of Proteins in Serum and CSF", November 8, 1983
15. American Association for Clinical Chemistry, North Carolina Section Meeting, Chapel Hill, NC, "Effect of Exercise on Clinical Laboratory Tests", June 12, 1984
16. Association of Clinical Scientists, Newport, Rhode Island, "Use of Recombinant DNA Technology in the Clinical Chemistry Laboratory", May 10, 1985

17. Association of Clinical Scientists, Louisville, Kentucky, "Noncardiac Sources of CK MB", October 10, 1985
18. Prostate Cancer Collaborative Group, UNC-CH, "Transferrin and Other Markers of Prostate Cancer", January 9, 1986
19. Pediatric-Genetics Grand Rounds, UNC-CH, "Use of DNA Probe Linkage Analysis in Cystic Fibrosis", October 23, 1986
20. Department of Neurology Journal Club, UNC-CH, "Molecular Probes in Duchenne Muscular Dystrophy", November 12, 1986
21. Internal Medicine '87 Continuing Education Symposium, UNC-CH, "Clinical Applications of Linkage Analysis in Cystic Fibrosis", March 12, 1987.
22. Department of Neurology Resident's Conference, UNC-CH, "CSF Apo E Index in Patients with MS", March 30, 1987
23. Selected Topic, Prenatal Diagnosis, AACC National Meeting, "Applications of Linkage Analysis in Cystic Fibrosis Testing", July 22, 1987
24. Department of Neurology Symposium on Nerve and Muscle Research, UNC-CH, "Genotypic and Phenotypic Tests for Duchenne Muscular Dystrophy", August 11, 1987
25. Department of Medicine Grand Rounds, UNC-CH, "Current Status of DNA Diagnosis of Genetic Diseases at UNC", March 3, 1988.
26. Department of Pathology Grand Rounds, Georgetown University, "Current Status of Myeloma Workup", July 8, 1988.
27. Department of Pathology Grand Rounds, University of California at San Francisco, "Current Status of Myeloma Workup and Demyelinating Disorders", August 8, 1988
28. Ciba-Corning, Medfield, MA, "Diagnosis of Duchenne Muscular Dystrophy", August 26, 1988.
29. Department of Medicine Grand Rounds, UNC-CH, "Is Cystic Fibrosis a Single Disorder?", December 1, 1988.
30. Department of Pathology, Ohio State University, "Is Cystic Fibrosis a Single Disorder?", December 5, 1988.

31. Ohio Valley Section-American Association of Clinical Chemistry, Cincinnati, Ohio, "Clinical Applications of Nucleic Acid Probe Technology", February 25, 1989.
32. Duke/UNC Pediatric Pulmonology Conference, Hotel Europa Center, "Genetic Heterogeneity in Cystic Fibrosis", March 17, 1989.
33. IX International Latinoamerica Congress on Biochemistry, Carracas, Venezuela, "Clinical Applications of Nucleic Acid Probes", April 24, 1989.
34. University of Carracas, Carracas, Venezuela, "DNA Analysis in Cystic Fibrosis and Duchenne Muscular Dystrophy", April 26, 1989.
35. China Medical University, Shenyang, Peoples Republic of China, "Molecular Analysis of Duchenne Muscular Dystrophy", May 16, 1989.
36. Peking Medical University, Beijing, P.R. China, "Molecular Analysis of Duchenne Muscular Dystrophy", May 20, 1989.
37. Neurology Grand Rounds, UNC-CH, "Molecular Analysis of Duchenne and Becker Muscular Dystrophy", July 17, 1989.
38. Triangle Consortium for Medical Technology, Burroughs Wellcome, Research Triangle Park, "Molecular Laboratory Medicine - 1990", October, 17, 1989.
39. Department of Medicine Grand Rounds, UNC-CH, "Update on CF", October 19, 1989.
40. North Carolina Section of the American Association for Clinical Chemistry - Fall Symposium, Raleigh, NC, "Molecular Newborn Screening for DMD", October 20, 1989.
41. Innovation in Progress, Carolina Inn, "Molecular Newborn Screening for Muscular Dystrophy", October 30, 1989.
42. Department of Pediatric Grand Rounds, UNC-CH, "Update on Duchenne and Becker Muscular Dystrophy", January 25, 1990.
43. Duke/UNC Pediatric Pulmonology Conference, Hotel Europa-Omni, "Molecular Pathology of Cystic Fibrosis", February 23, 1990.
44. Special Topics in Biochemical Research, Department of Biochemistry, UNC-CH, "Molecular Diagnosis of Genetic Diseases", May 25, 1990.
45. XIV International Congress of Clinical Chemistry, "Applications of Molecular Genetics in Cancer", San Francisco, CA, July 25, 1990.

46. Pediatric Grand Rounds, Wake Hospital AHEC, Raleigh, NC, "Update on Molecular Diagnosis of Genetic Diseases", September 19, 1990.
47. Bexpo '91 - Symposia on Progress in Clinical Laboratory Medicine: "Impact of Genetic Diseases in the Clinical Laboratory", Chicago, January 17, 1991.
48. Bexpo '91 - Symposia on Progress in Clinical Laboratory Medicine: "Impact of Genetic Diseases in the Clinical Laboratory", Baltimore, January 18, 1991.
49. Bexpo '91 - Symposia on Progress in Clinical Laboratory Medicine: "Impact of Genetic Diseases in the Clinical Laboratory", Cincinnati, January 24, 1991.
50. Bexpo '91 - Symposia on Progress in Clinical Laboratory Medicine: "Impact of Genetic Diseases in the Clinical Laboratory", Boston, January 31, 1991.
51. Bexpo '91 - Symposia on Progress in Clinical Laboratory Medicine: "Impact of Genetic Diseases in the Clinical Laboratory", Los Angeles, February 14, 1991.
52. Pathology Grand Rounds, Medical College of Virginia, "Molecular Pathology - 1991", February 22, 1991.
53. CF Educational Parents Meeting, Camp Carefree, NC, "DNA Testing in Cystic Fibrosis", April 27, 1991.
54. American Association for Clinical Chemistry National Meeting, Symposium - "Molecular Techniques in Diagnosis and Definition of Genetic Diseases", Washington, DC, July 31, 1991.
55. American Association for Clinical Chemistry, Pittsburgh Section, "Update on Molecular Diagnosis for CF", October 17, 1991.
56. Bexpo '91 - "Integration of Protein Electrophoresis and Quantitation", Miami, FL, November 22, 1991.
57. Texas Society for Medical Technology, "Solving the Protein Puzzle", Arlington, TX, April 3, 1992.
58. 20th World Congress of Medical Technology, "Use of Molecular Biology Techniques as Diagnostic Tools in Duchenne Muscular Dystrophy and Cystic Fibrosis", Dublin, Ireland, July 29, 1992.
59. Beckman Symposium, "Impact of Molecular Genetics on the Clinical Laboratory", Sioux Falls, ND, November 18, 1992.

60. AHEC, "Clinical Applications of DNA Probes", Greensboro, NC, December 1, 1992
61. Program for Minority Advancement in the Biomolecular Sciences, "Molecular Diagnosis of Cystic Fibrosis", January 30, 1993.
62. Abbott Laboratories, Chicago, "Molecular Pathology of Cystic Fibrosis", March 4, 1993.
63. Genetics Curriculum Seminar, UNC-CH, "Molecular Pathology of Cystic Fibrosis", March 5, 1993.
64. Clinical Ligand Society 19th National Meeting, Dearborn, Michigan, "Diagnostic Tools in Molecular Pathology", April 22, 1993.
65. Program for Minority Advancement in the Biomolecular Sciences, "Molecular Diagnosis of Cystic Fibrosis", January 30, 1993.
66. XV International Federation on Clinical Chemistry, Melbourne, Australia, "Diagnostic Tools in Molecular Pathology", November 19, 1993.
67. International Conference on Clinical Molecular Biology, Perth, Australia, "Correlation of Genotype to Phenotype in Cystic Fibrosis", November 22, 1993.
68. AHEC, "DNA Probes in Clinical Medicine", Asheville, NC, December 7, 1993.
69. Pine Needles Retreat - Department of Hospital Laboratories, "Localized In Situ Amplification", March 15, 1994.
70. AHEC, "What's New in Laboratory Medicine", Wilson Memorial Hospital, May 7, 1994.
71. Roche Molecular Systems, "Beyond DNA Probes", Alameda, CA, June 9, 1994.
72. Academy of Clinical Laboratory Physicians and Scientists, Pasadena, CA, "New Tools in Molecular Pathology", June 10, 1994.
73. Diagnostico Molecular en Ciencias Genetics, Medicina y Medio Ambiente, San Jose, Costa Rica, "Estudios geneticos en fibrosis quistica", November 19, 1994.
74. Ob-Gyn Grand Rounds, UNC-CH, "Genetic Heterogeneity in Cystic Fibrosis", December 14, 1994.
75. Keynote Speaker for Basic and Clinical Research Day, Department of Pathology, Ohio State University, April 17, 1995: "CFTR Mutations and Truncated Proteins in NF1, BRCA1, APC, and Other Tumor Suppressor Genes".

76. European Conference of Clinical Chemistry, Tampere, Finland, July 7, 1995: "Mutation Detections Schemes in the Clinical Laboratory".
77. The National Neurofibromatosis International Consortium on the Molecular Biology of NF1 and NF2, July 14, 1995: "The Limitations and the Power of the Protein Truncation Assay for Diagnostic or Presymptomatic Testing for NF1".
78. XII Latin American Congress for Clinical Biochemistry, Buenos Aires, Argentina, September 9, 1995: "Molecular Biology and its Application to the Clinical Laboratory".
79. AHEC, Wilson, N.C., September 19, 1995: "Molecular Diagnostic Techniques".
80. Hartford Hospital, Hartford, Conn., October 10, 1995: "CFTR, NF1, and BRCA1: Example of Genetic Heterogeneity".
81. AHEC, Whiteville, N.C., October 17, 1995: "Markers of Acute Myocardial Infarction".
82. FMC, Inc, Rockland, Maine, December 7, 1995: "Molecular Diagnosis of NF1".
83. Bio-Rad, Inc, Hercules, CA, February 2, 1996: "Protein Truncation Test in NF1 and BRCA1".
84. CALGB, Inc., Durham, NC, June 10, 1997: "Interpretation of Molecular Genetic Laboratory Data".
85. AHEC, Burgaw, N.C., December 2, 1997: "Markers of Acute Myocardial Infarction".
86. IFCC-Roche, Singapore, March 17, 1998: "Hemochromatosis: A Modifier gene for CF".
87. Becton Dickinson & Co., Research Triangle Park, NC., June 19, 1998: "Mutation Scanning Versus Mutation Detection".
88. AACC National Meeting, Chicago, IL, August 5, 1998, "Mutations Scanning Versus Mutation Detection".
89. New York State Lab Conference on Hemochromatosis, Hemochromatosis Carriers and CF, November 4, 1998.
90. DNA Beaumont Conference, Detroit, BRCA1/2 Genotyping, March 26, 1999
91. AACC National Meeting, New Orleans, LA, Pre-Analytical Quality Control Issues in Molecular Pathology, July 28, 1999.

92. San Diego Conference, San Diego, CA, Is HFE Gene a Modifier Locus for Cystic Fibrosis?, November 18, 1999
93. Miriam Reiner Award Lecture, Capital Section Annual Awards, Baltimore, MD, Is Cystic Fibrosis a Monogenic Disorder?, December 1, 1999
94. American Society of Human Genetics National Meeting, Philadelphia, "HFE Mutations are Associated with Colon Cancer", October 5, 2000.
94. Hartford Hospital, Hartford Connecticut, "Are There Any Single Gene Disorders?", October 20, 2000.
95. UNC-Greensboro, Greensboro, NC, "Limitations of Molecular Testing.", March 29, 2001.
96. Genzyme Genetics, Framingham, MA, "Modifier Genes and Gene Sharing: Multiple Organ Effects of CFTR" April 26, 2001.
97. AHEC, Wilmington, NC, "Cardiac Markers", November 26, 2001.
98. University of Virginia, Department of Pathology Grand Rounds, "Cystic Fibrosis Gene Mutations Increase the Risk of Pancreatitis and Liver Disease", December 13, 2001.
99. UNC-Greensboro, Greensboro, NC, "Molecular Genetic Testing", February 14, 2002.
100. AHEC, Rocky Mount, NC "Cardiac Markers", February 26, 2002.
101. Northwestern University, Chicago, IL, "Be Careful What You Test For..", May 16, 2002.
102. Georgia State University, Atlanta, GA, "Population-Based CF Carrier Screening", August 6, 2002.
103. Lynchburg Valley Hospital, Lynchburg, VA, "CF Population-based Testing", November 29, 2003

#### SPECIAL HONORS AND AWARDS:

Kappa Scholar; Chi Epsilon Mu Honorary (Chemistry)  
Washington and Jefferson College ---

ISCABER Award (Research Society in Basic Sciences)  
Ohio State University ---

AACC Award for Outstanding Scientific Achievement by a  
Young Investigator, 1976

Philip Blatt Award for Teaching Laboratory Medicine, selected by

University of North Carolina Pathology Residents, 1986

Miriam Reiner Award from Capital Section AACC for  
Contributions to Clinical Chemistry, 1999

AACC Award for Outstanding Contributions in Education, 2001